

UNITED STATES GOVERNMENT

# Memorandum

TO : Warren L. Carter, Acting Chief  
Program Support Branch - Water

DATE: January 7, 1972

FROM : Chemical Engineer  
Middle Atlantic Region

SUBJECT: In-office Review of Greeley and Hansen Preliminary Design Report on Philadelphia Southwest Treatment Plant, City of Philadelphia Water Department, December 1971.

Review of the Greeley and Hansen Preliminary Design Report on Philadelphia Southwest Treatment Plant discloses the following summary on design for upgrading and expanding that treatment facility:

## Existing Facility

Date Completed - 1954

Degree of Treatment - Primary

Design Average daily flow - 136 mgd

Treatment sequence - Screening and grit removal, aeration, primary sedimentation, chlorination, separate anaerobic sludge digestion and ocean disposal.

## Population and Average Daily Flow Projections

Population Projection Year - 1990

S. W. Philadelphia and suburbs - 1,045,000 @ 155gpcd = 162 mgd

Eastern Delaware County - 480,000 @ 100gpcd = 48 mgd

Total . . . . . 1,525,000 210 mgd

## Proposed Facility

Construction Date - not stated

Operation Date - December 1975

Degree of Treatment - Secondary

BOD removal at startup - 91%

Design Average Daily Flow - 210 mgd

Treatment sequence - Screening and grit removal, primary sedimentation, oxygenation by "Unox" process with oxygen generation facility, final sedimentation, chlorination, separate anaerobic sludge digestion.

Based on a population projection by Greeley and Hansen for Southwest Philadelphia and Eastern Delaware County of 1,525,000 for 1990 and substantiation of this estimate by a Delaware Valley Regional Planning Commission projection of 1,072,840 for 1985, the population equivalent considered to give a 210 mgd average daily flow appears to be adequate for Philadelphia Southwest. This population projection breakdown for 1990 reveals a population equivalent for Eastern Delaware County of 480,000 at 100 gpcd or 48 mgd average flow. This consideration is



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is consistent with a 50 mgd average flow allocation recommended by Albright and Friel in their Preliminary Draft on Delaware County Regional Project in their Preliminary Draft on Delaware County Regional Project.

Estimated cost for upgrading and expanding Philadelphia Southwest has been estimated at \$52 million for Alternate 1 and \$67 million for Alternate 2. Alternate 1 construction calls for all facilities to be enclosed except for primary sedimentation, final sedimentation, and chlorine contact tanks to be open. Alternate 2 calls for enclosure of all facilities. Both alternates utilize existing facilities.

The proposed means of sludge activation is the Union Carbide "Unox System" utilizing enriched oxygen aeration rather than the conventional air aeration. Union Carbide contends that "Unox" has the following advantages over conventional aeration:

1. Better treatment quality at reduced cost.
2. Reduced capital cost.
3. Reduced operation cost.
4. Reduced sludge disposal cost.
5. Reliable process control.
6. Effective odor control.
7. Reduced land area.

Carbide further contends that a total treatment cost reduction of up to 40% may be realized. Though many of Carbide's claims seem plausible, the evaluation of oxygen aeration as a substitute for conventional air aeration is premature considering the lack of "on-line" operational evidence.

Considering the comprehensive nature of this report evidenced by the completeness of design considerations, the question again arises, "Why require two years for final design on the solution of such a pressing problem?" Design and construction are scheduled so as to coincide with the March, 1970 Delaware River Basin Commission Abatement Schedule, a schedule not approved by the Administrator of the Environmental Protection Agency in lieu of the June, 1972 compliance date.

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